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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/828,839	04/21/2004	Nikolaos Koudas	ATT 2002-0457	5311

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RAYYAN, SUSAN F	
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07/08/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/828,839	KOUDAS ET AL.	
	Examiner	Art Unit	
	SUSAN FOSTER RAYYAN	2167	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *23 March 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *6-10* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *6-10* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1-5, 11-24 are canceled. Claims 6-10 are pending.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 6-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 2004/0003004 A1 issued to Surajit Chaudhuri et al. ("Chaudhuri") and US 7295956 issued to Gregory R. Ruetsch ("Ruetsch") and US 6,088,524 issued to Alon Levy et al ("Levy").

As per claim 6 Chaudhuri teaches:

preprocessing a database having a relation to produce an index (see paragraph 42,
lines 1-4, index is built over relations), wherein said preprocessing step comprises:

receiving at a computer having a query optimization module a query having aggregation constraint and applying at said computer having a query optimization module said index to look up a result in response to said query having aggregation constraints (paragraph 25, database server receives and processes

queries to retrieve, delete and update using SQL which includes aggregation constraints and paragraph 26, lines 2-4, as possessing the query using an index).

Chaudhuri does not explicitly teach identifying a dominating vector of constants, c' for a given n-dimensional vector of constants, c. Ruetsch does teach this limitation (abstract, column 5, line 63 through columns 6, line 25 as n-dimensional vectors and column 8, lines 6 through 11 as dominating an interval vector). It would have been obvious to a person of ordinary skill in the art at the time of the invention was made to modify Ruetsch with identifying a c' for a given n-dimensional vector to efficiently solve a multi-objective optimization problems as described by Ruetsch at abstract.

Chaudhuri and Ruetsch do not explicitly teach wherein said aggregation constraints are Optimization Under Parametric Aggregation Constraints (OPACs). Levy does teach his limitation at column 5, line 46 to column 6, and line 5 as constraint language. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify Chaudhuri and Ruetsch with wherein said aggregation constraints are Optimization Under Parametric Aggregation Constraints (OPACs) to identify aggregation predicates which are relevant to deriving new predicates useful in optimizing the solution to a query as described by Levy at column 5, lines 25-35.

As per claim 7, same as claim argument above and Chaudhuri teaches:

obtaining a partition defined by said vector c and said vector c' (paragraph 9, as candidate data structures equate to the index containing pointers to partitions).

Claims 8-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chaudhuri and Ruetsch and Levy as applied to claim 7 above, and further in view of US Patent 6,122,628 issued to Vittorio Castelli et al ("Castelli").

As per claim 8, same as claim arguments above and Chaudhuri and Ruetsch and

Levy do not explicitly teach wherein said partition is expressed as a hyper rectangle. Castelli does teach this limitation (column 17, lines 62- column 18 lines 11, hyper rectangles) to generate compact indexes such that most of the index can reside in main memory. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify Chaudhuri and Ruetsch and

Levy with wherein said partition is expressed as a hyper rectangle to generate compact indexes such that most of the index can reside in main memory as described by Castelli (abstract).

As per claim 9, same as claim arguments above Chaudhuri and Ruetsch and Levy do not explicitly teach inserting said partition into a multidimensional data structure. Castelli does teach inserting said partition into a multidimensional data structure (column 12, lines 62-63 as R-tree) to generate compact indexes such

that most of the index can reside in main memory. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify Chaudhuri and Ruetsch and Levy with inserting said partition into a multidimensional data structure to generate compact indexes such that most of the index can reside in main memory as described by Castelli (abstract).

As per claim 10, same as claim arguments above and Castelli teaches: wherein said multidimensional data structure is an R-Tree (column 12, lines 62-63 as R-tree).

Response to Arguments

3. Applicant's arguments filed March 23, 2009 have been fully considered but they are not persuasive.

4. Applicant argues Chaudhuri does not teach receiving queries and providing answers to the queries. Chaudhuri teaches this at [0025], as a database server processes queries, for example to retrieve, insert, delete, and/or update data in the database.

5. Applicant argues Ruetsch does not teach identifying a dominating vector of constants, c' for a given n-dimensional vector of constants, c. Applicant argues Ruetsch does not know whether a single domain is a dominated domain. Examiner finds Ruetsch does teach this limitation (abstract, column 5, line 63 through columns 6, line 25 as n-dimensional vectors and column 8, lines 6

through 11 as dominating an interval vector). In addition at column 8, lines 25-28, eliminate any sub-domain which were certainly dominated then the remaining sub-domains would be bisected and procedure repeated until a stopping criteria is met.

Conclusion

6. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Contact Information

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Susan F. Rayyan whose telephone number is 571-272-1675. The examiner can normally be reached on M-F, 7:30-4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Cottingham can be reached on 571-272-7079. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/SUSAN FOSTER RAYYAN/

Examiner, Art Unit 2167

July 2, 2009

/John R. Cottingham/

Supervisory Patent Examiner, Art Unit 2167